

REMARKS/ARGUMENTS

The Office Action dated September 7, 2006 has been carefully considered. Claims 4-6 are pending in the present application with claim 4 being in independent form. By the present Amendment, claim 4 has been amended in order to further clarify the features of the present application.

Claims 4 and 6 have been rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over U.S. Patent No. 4,587,843 to Tokura et al. (hereinafter "Tokura"). Reconsideration of this rejection is respectfully requested.

The Examiner contends that Tokura shows all the features of claim 4 of the present application except for employing the device in a diesel engine. The Examiner contends that it would have been an obvious matter of design choice to utilize the device in a diesel engine since diesel engines are conventional. Applicant respectfully disagrees.

As an initial matter, Applicant points out that the claims of the present application are drawn to a system for controlling intake air temperature in internal combustion diesel engines suitable for heating intake air and controlling the temperature. In contrast, Tokura relates to a thermocouple type gas flow measuring apparatus. That is, Tokura is primarily a gas flow meter. In order to further clarify the features of the present application, the reference to the flow rate has been removed from claim 1.

Tokura, as understood by Applicants, relates to gas flow measuring apparatus that includes a plurality of thermocouples formed in a series on a substrate. Every other thermojunction of the thermocouple is located upstream of an electric heater, while the remaining thermojunctions of the thermocouple are located downstream of an electric heater. In Tokura, the gas flow measuring apparatus is provided in a spark ignition engine for driving an automobile in which air for combustion is sucked through an air cleaner 2, a rectifier grid 3 and an intake air passage 4. Provided in the intake air passage 4 there is a throttle valve 5 operated by a driver. The gas flow measuring apparatus is provided in an intake air passage 4 between the rectifier grid 3 and the throttle valve 5 and bears the reference numeral 6. The apparatus 6 includes a conduit 61 in which a sensing portion 62 is mounted.

The sensing portion 62 includes a substrate 21 on which thin platinum-rhodium deposits N₁ through N₁₀₁ are formed. Platinum has a different thermoelectromotive force from that of platinum-rhodium. The thin platinum deposits M₁ through M₁₀₀ and the platinum-rhodium deposits N₁ through N₁₀₁ are alternately connected in series at the thermojunctions J₁ through J₁₀₀ and thermojunctions J'₁ through J'₁₀₁. The first group of thermojunctions J₁ through J₁₀₀ is located at an upstream side of a heater while a second group of thermojunctions J'₁ through J'₁₀₀ is located downstream of the heater. When power is supplied through terminals 29 and 30, the thin platinum deposit 26 generates heat and air flows in the direction indicated by the arrow, the regional air affects the first thermojunctions J₁ through J₁₀₀ and the air heated by the heater affects the second group of thermojunctions J'₁ through J'₁₀₀. In operation, the intake air amount, determined by the opening of the throttle 5, is sucked from the air cleaner 2 via rectifier grid 3 into the engine 1. At the same time, a definite amount of the air passes through the gas passage 61. The first thermojunction group J on the upstream side is affected only by the temperature of the gas stream and the second thermojunction group J' on the downstream side is affected by the heat amount generated by the heater in addition to the temperature of the gas stream, that is the temperature of the heated gas stream. As a result, a difference ΔT in temperature between the first and second thermojunction groups J and J' is generated. The sensing circuit 64 controls the current I flowing through the heater 26 so that the total electromotive force ΔV is constant. That is, when the intake air amount is increased, the increase in temperature of the intake air by the heater 26 is reduced. Thus, the difference ΔT in temperature and the electromotive force ΔV is reduced. As a result the output voltage V₁ of the amplifier 64b is reduced. Thus, in Tokura the value of ΔT is utilized in order to determine the flow rate of gas.

In contrast, the present invention is directed to a system that controls air intake temperature and heats intake air. The flow rate of the air is of less concern. The primary concern is the temperature T measurement which is important in heating the intake air and in avoiding damage to the motor due to overheating of a heating element, for example.

Further, it is noted that Tokura requires at least two resistances mounted in series in a direction of a flow of air wherein the first resistance measures a ΔT with respect to a virtual

reference and the second supplies heat for a short time to see how the temperature of the resistance falls with respect to the virtual reference. In the present application while flow may be determined it is not determined in the manner described in Tokura.

Further, while the Examiner states that it would be obvious to implement the flow sensor described in Tokura in a diesel engine, this is incorrect.

As is well known, “[T]o establish a *prima facie* case of obviousness ...there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference.” See M.P.E.P. §2143. The Examiner has failed to identify such a motivation in the present application. Indeed, the Tokura reference would tend to teach away from its use in a diesel engine since it specifically describes use in a spark ignition engine, which is not a diesel engine. While diesel engines are known, they operate in a substantially different manner than spark ignition engines and utilize different fuel as well. For example, the fuel used in spark ignition engines has a low flash point and thus the temperature of the intake air is of less importance. In contrast, in a diesel engine, such as that required by claim 4, it is necessary to monitor and be able to heat the intake air in order to obtain suitable combustion in certain working conditions. This is unnecessary in spark ignition engines. In light of the substantial differences between diesel and non-diesel engines, Applicants can see no possible suggestion to attempt to modify a non-diesel engine of Tokura to work like a diesel engine.

Further, the system of Tokura would not be operative in a diesel engine. As is noted above, only a portion of the intake air is provided in the intake 61 and used to determine the flow rate, the rest of the intake air enters the engine without any heating. Thus, the system of Tokura would not work if it were used in a diesel engine, since it would not properly heat the air to allow for ignition of the diesel engine. As it is well known, in order to establish *prima facie* case of obviousness, there must be a reasonable expectation of success in the combination suggested by the Examiner. See M.P.E.P. §2143. In the present application, the combination suggested by the Examiner would not be successful.

In addition, the fact that a reference can be modified does not render the resulting combination obvious unless the prior art also suggests the desirability of the combination. See

M.P.E.P. §2143.01 III quoting *In re Mills* 916 F2d 680, 16 U.S.P.Q. 2d 1430 (Fed Cir. 1990). As is noted above, if the system of Tokura were used in a diesel engine, as suggested by the Examiner, not only would there be no benefit, but in fact, the engine would not work. Thus, the modification suggested by the Examiner would render Tokura inoperable.

Accordingly, it is respectfully submitted that claim 4, and the claims depending therefrom, are patentable over the cited art for at least the reasons described above.

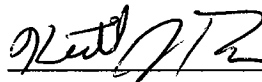
Applicants appreciate the Examiner's indication that claim 5 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. However, claim 5 depends from claim 4. As noted above, it is believed that claim 4 is patentable over the cited art for at least the reasons described above. Thus, it is believed that claim 5 is patentable in its present form.

In light of the remarks and amendments made herein, it is respectfully submitted that claims 4-6 are patentable over the cited art and are in condition for allowance.

Favorable reconsideration of the present application is respectfully requested.

Respectfully submitted,

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